

INDEX.

Additions to distribution systems.....	250-259
Address of welcome Philadelphia Convention. By Hon. Rudolph Blankenburg.....	202
Address by President Thomas.....	205
Agar, advisability of substituting for gelatine as a medium for determining bacterial counts.....	11
Agar, compared with gelatine.....	526
Agar counts compared with gelatine for various coli conditions.....	13-16
Aggregate used in concrete work.....	352
Albany, N. Y., filter site at.....	467
reduction of typhoid by filtration at.....	34
slow sand filters at.....	33
Algae growths, effect of ozone on.....	629
Altoona, Germany, efficiency of filters at.....	31
Alumina sulphate best coagulant.....	487
American Public Health Association, adoption of agar for bacteria analysis by.....	11
Analysis, use of agar and gelatine in bacteria.....	11
Auburn, N. Y., legal decision in pollution case.....	688
rules for check valves at.....	95
use of liquid chlorine at.....	450
Automatic Sprinklers, as safe guards to human life.....	653
efficiency of.....	652
quantity of water used by.....	654
Avalon, Md., filters at.....	486
Bacteria, no method of getting quantitative estimates of.....	17
uselessness of percentage removal estimates.....	17
Baltimore Filter Plant, description of.....	497
Baltimore County Water and Electric Company filters at Avalon, Md.....	486
Belmont Filter Plant, Experiments with liquid chlorine.....	416
use of liquid chlorine.....	425
Bleach, comparison of with liquid chlorine at Torresdale filtration plant. 420	
use of at Exeter, N. H.....	449
Boilers, how should house be cared for when water turned off.....	668
Boundary waters, pollution of by sewage.....	25
powers of joint commission on.....	25
BRIEF REVIEW OF SEWAGE DISPOSAL WORKS IN SOME EUROPEAN CITIES AND COMPARISON WITH THE PENNYPACK CREEK WORKS AT PHILADELPHIA. Paper by George E. Datesman.....	359
Calcium hypochlorite at Torresdale filtration plant.....	404
Cast iron pipe, diagrammatic method of determining cost per foot.....	612

Cement, classification.....	350
first production in America.....	349
made by Egyptians.....	347
mixed or blended.....	351
natural.....	351
Portland.....	350
Pozzoulana.....	351
CHEAP HOMEMADE TEST PLUG FOR WATER MAINS, A. Paper by W. E. Haseltine.....	717
Check valves, double required on fire services at Auburn, N. Y.....	90
method of testing.....	92
on metered services.....	671
rules of Auburn water department for.....	92
specifications for.....	90
testing of.....	90
Chloride of lime, disadvantages of.....	408
experience with at Torresdale.....	403
reactions of.....	441
Chlorine, ortho-tolidin test for free.....	734
Cincinnati, Ohio, filter site.....	469
mortality statistics.....	487
rapid sand filters at.....	54, 473
Cincinnati, Ohio, results of rapid sand filters at.....	55
Coagulant, patent for granted to Hyatt in 1884.....	31
Coagulants, sulphate of alumina the best.....	487
used in mechanical filters.....	483
Coagulating chemicals.....	59
Coagulation, action taking place in.....	60
ancient use of.....	64
definition of.....	59
effect on hardness of water.....	66
in preparatory treatment of water.....	62
reasons for effect of.....	58
use in large settling basins.....	64
with sedimentation alone.....	65
Coli, counts on agar and gelatine.....	18
Colon-Bacilli, best indication of sanitary conditions.....	17
Columbus, Ohio, filter site.....	469
rapid sand filters at.....	57
Committees 1914-15.....	June III
Committees, Philadelphia local.....	6
Comparison between cost of mechanical and slow sand filters.....	496
Comparison of gelatine and agar media.....	526
Comparative cost of filters.....	500
Concrete in water works construction.....	345
Concrete, expansion and contraction.....	356
mixing.....	355
placing.....	355

Concrete, proportioning.....	353
reinforcement.....	357
rendering water tight.....	356
water proof.....	356
Concrete in ancient construction.....	347
Concrete in modern construction.....	349
CONSERVATION OF POTABLE WATER AND THE DUAL SYSTEM OF DISTRIBUTION. Paper by Henry C. Hodgkins.....	554
discussion by F. W. Cappelen.....	563
J. N. Chester.....	558
H. C. Hodgkins.....	560, 564
D. D. Jackson.....	561
F. C. Kimball.....	562
F. W. Langstroth.....	561
P. A. Maignen.....	561, 564
Construction, metering water used for.....	683
Contact beds, in sewage disposal.....	369
Convention 1914	
address of welcome by Hon. Rudolph Blankenburg, Mayor.....	202
address by President Thomas.....	205
attendance.....	193
exhibitors.....	193
minutes, committees, etc.....	195
Convention 1915, announcement.....	194
Cost of filters compared.....	496, 500
Cost of cast iron pipe, diagrammatic method of determining.....	612
Cost of water plants, local conditions an important factor.....	615
CROTON WATER SUPPLY: ITS QUALITY AND PURIFICATION. Paper by	
George W. Fuller.....	135
discussion by James M. Caird.....	180
J. M. Diven.....	176
D. W. French.....	175
G. W. Fuller.....	463
Frank E. Hale.....	179
Allan Hazen.....	180
Nicholas S. Hill, Jr.....	177
George A. Johnson.....	182
Dr. William P. Mason.....	174
Alexander Potter.....	456
Croton aqueduct, description of.....	137
hydraulic gradient of.....	161
Croton filters, details of design of.....	162
Croton water, average quality 1912.	
connections to city.....	137
cost of protection of water shed.....	172
microscopic organisms in.....	144
quality of.....	140
turbidity of.....	146

Croton water, turbidity of as effected by Catskill supply.....	160	
use of hypochlorite with.....	150	
Croton water shed.....	136	
Darnell, Major C. R., introduction of liquid chlorine in water sterilization.....	415	
DeMare sterilizer.....	566	
Death rate reduced by filtration.....	516	
Decarbonization of Croton water.....	162	
Detroit river, pollution of.....	28	
DIAGRAMMATIC METHOD OF DETERMINING THE COST PER FOOT OF CAST IRON PIPE. Paper by W. E. Miller.....		612
DISINFECTING 200,000,000 GALLONS OF WATER A DAY—EXPERIENCE WITH CHLORIDE OF LIME AND LIQUID CHLORINE AT TORRESDALE FILTRATION PLANT. Paper by Francis D. West.....		403
discussion by J. W. Ackerman.....	450	
H. F. Huy.....	451	
C. A. Jennings.....	453	
G. A. Johnson.....	454	
W. F. Montfort.....	446	
R. S. Weston.....	448	
G. C. Whipple.....	455	
Distribution systems, additions to.....	252-259	
information relative to.....	245	
Dual system of distribution.....	554	
Economy in ordering hydrants.....	539	
EFFICIENCY OF HOUSEHOLD FILTERS IN CHICAGO. Paper by Arthur Lederer and Frank Bachman.....		589
discussion by J. M. Diven.....	600	
W. F. Montfort.....	601	
S. T. Powell.....	601	
Frank L. Rector.....	600	
Election of officers.....	212	
Electrolytic action on pipes.....	250, 259	
Electrolytic sodium hypochlorite at Torresdale filtration plant.....	403	
Elmira, N. Y., typhoid fever at.....	485	
EQUITABLE HYDRANT RENTALS AND BETTER METHODS FOR APPORTIONING FIRE PROTECTION COST. Paper by John W. Alvord.....		95
discussion by J. W. Alvord.....	699, 700, 702	
J. D. Barnett.....	697	
Albert Blauvelt.....	699, 700	
Oscar Bulkeley.....	697, 702	
J. N. Chester.....	545	
W. C. Hawley.....	541, 700	
H. C. Hodgkins.....	698	
Alexander Potter.....	538	
A. A. Reimer.....	698	
Exeter, N. H., use of liquid chlorine and bleach.....	448	
Filter plant, design of for New York.....	153	

Filter plant, difficulty in securing proper managers for.....	30
Filter sites, Cincinnati, Ohio.....	469
Columbus, Ohio.....	469
Pittsburgh, Pa.....	467
Torresdale, Philadelphia.....	468
Filter sites for Croton water supply.....	469
Filtered water, population of United States supplied with.....	73
Filters, at Albany, N. Y.....	467
bids for Jerome Park, N. Y.....	167
capacity of rapid sand 1910.....	47
capacity of rapid sand 1914.....	48
change of type of rapid sand.....	46
clogging of by acid waters.....	43
comparison of types of.....	153
comparative charges per 1,000,000 gallons for sand and mechanical.....	155
comparative estimate of sand and mechanical for New York.....	154
comparative growth of slow and rapid sand.....	72
cost of operation of slow and rapid sand.....	70
cost of slow and rapid sand.....	69
cost, efficiency, simplicity of operation of slow sand.....	40
date of first plant.....	31
detail plans for mechanical for New York.....	158
details for design for Croton.....	162
early ones slow sand type.....	31
efficiency of at Pittsburgh, Pa.....	40
efficiency of at Washington, D. C.....	36
first in United States at Poughkeepsie, N. Y.....	31
first rapid sand at Somerville, N. J., 1885.....	45
household, efficiency of in Chicago.....	589
household, functions of.....	590
household, types of.....	590
mechanical sand washing at Wilmington, Del.....	129
operation of, not always good.....	29
percolating in sewage disposal.....	369
population of United States supplied by slow and rapid sand.....	74
population supplied by rapid sand in 1910.....	47
population supplied by rapid sand in 1914.....	48
questions concerning mechanical for New York.....	156
questions concerning sand for New York.....	157
rapid sand at Cincinnati, Ohio.....	54
rapid sand at Columbus, Ohio.....	57
rapid sand at Little Falls, N. J.....	46
rapid sand at Louisville, Ky.....	56
rapid sand at New Orleans, La.....	50
rapid sand built in United States 1885-1910.....	47
rapid sand built in United States 1910-1913.....	48
relative hygienic efficiency of slow and rapid sand.....	71
results of operation at Cincinnati of.....	55

Filters, results of operation of at Columbus, Ohio.....	58
results of operation of at Little Falls, N. J.....	49
results of operation at Louisville.....	57
results of operation at New Orleans.....	54
slow sand at Albany, N. Y.....	33
slow sand at Lawrence, Mass.....	32
slow sand at Philadelphia, Pa.....	37
slow sand at Pittsburgh, Pa.....	39
slow sand at Washington, D. C.....	34
turbidity limit of slow sand.....	38
typhoid death rate before and after introduction of sand.....	72
Filtration as affecting red water troubles.....	67
Filtration at Wilmington, Del.....	116
chemicals for at New York.....	160
distribution of population supplied by sand.....	76
first recognized as means of reducing disease.....	31
growth of rapid sand in United States.....	45
growth of slow sand in United States.....	32
objection to use of chemicals in.....	58
opposition to, of Croton water.....	168
population supplied by slow sand in 1914.....	32
present day practice of.....	31
relative cost of slow and rapid sand processes of.....	68
slow sand in United States.....	44
slow sand plant at Wilmington, Del.....	121
typhoid reduced at Philadelphia by.....	37
Filtration in other countries.....	519, 520
FIRE ALARM ATTACHMENT FOR RECORDING PRESSURE GAGE. Paper by	
W. E. Haseltine.....	551
Fire lines, metering of, some remarks relative to.....	275
Fire losses, record of.....	652
Fire protection, cost in Wisconsin cities.....	96
fixing prices for.....	540
methods of computing compensation for.....	98
methods of apportioning cost of.....	95
method of determining cost of.....	96
payment for upkeep of hydrants.....	99
payment per miles of pipe for.....	99
per cent cost of.....	95
per cent total investment necessary for.....	101
pipe capacity unit basis for cost of.....	99
price per hydrant illogical.....	97
value of per capita.....	540
Fire service, private, information relative to.....	310-319
public, information relative to.....	298-309
Fire services, charges for.....	682
Fixing prices for fire protection.....	540
Foreword.....	1

FORTY-EIGHT INCH CAST IRON FORCE MAIN FOR ATLANTIC CITY, N. J.	
Paper by L. Van Gilder.....	704
Free chlorine, ortho-tolidin test for.....	734
Free water, remarks concerning.....	249
Freeport, Ill., determination of water works value at.....	101
Gages, use and benefit of pressure recording.....	103
used for testing hydrants.....	544
Gelatine, advisability of substituting agar for in determining bacterial counts.....	11
Gelatine and agar, comparison of.....	13-16, 526
Grand Rapids, Mich., rapid sand filter.....	472
GRAVITY WATER SUPPLY AT THE CITY OF MANILA, PHILIPPINE ISLANDS.	
Paper by H. E. Keeler.....	338
Great Lakes, remedies for sewage pollution of.....	24
Grit chambers.....	364
Ground water supplies, growing value of.....	715
rain fall available for.....	715
uncertain capacity of.....	715
GROWING VALUE OF GROUND WATER SUPPLIES, THE. Paper by L. J. LeConte.....	715
Hamburg, cholera epidemic in 1892.....	31
Hot water boilers, care of when water turned off.....	668
HOUSE TO HOUSE INSPECTION. Paper by A. Prescott Folwell.....	685
Household filters, efficiency of in Chicago.....	589
Hyatt, Isaiah S., granted filter patent in 1884.....	31
Hydrant rentals, advantages of inch foot method of determining.....	100
found insufficient by Wisconsin commission.....	95
inch foot of diameter basis for estimating.....	100
not proper method for paying for fire protection.....	539
price per hydrant illogical.....	97
Hydrants, equitable rentals for.....	95
false economy in ordering.....	529
payment for upkeep of.....	99
Hypochlorite, limitation of water treatment by.....	186
use with Croton water.....	150
INDIVIDUALITY OF PUBLIC UTILITIES, NOTABLY WATER WORKS. Paper by W. E. Miller.....	614
discussion by A. A. Reimer.....	696
Inspections, house to house.....	685
INVESTIGATION INTO THE ADVISABILITY OF SUBSTITUTING AGAR FOR GELATINE AS A MEDIUM FOR THE DETERMINATION OF BACTERIAL COUNTS IN WATER ANALYSIS. Paper by W. U. C. Baton.....	11
LABORATORY CONTROL OF WATER SUPPLIES. Paper by Edward Bartow.....	720
Lawrence, Mass., slow sand filters at.....	32
Lead lined pipe, experience with.....	648
LEGAL DECISION IN A WATER SUPPLY POLLUTION CASE. Paper by J. Walter Ackerman.....	688
discussion by Nicholas S. Hill, Jr.....	692
J. Walter Ackerman.....	693

Liquid chlorine, advantage of over chloride of lime.....	439
compared with bleach.....	420
description of apparatus.....	419
efficiency of at Philadelphia.....	425
experience with at Torresdale.....	403
experience with at Wilmington, N. C.....	418
experience with at Belmont Filter plant.....	416
first complete results.....	416
first permanent plant in Philadelphia.....	418
historical sketch of use of in the United States.....	415
introduction of by Major Darnell.....	415
objection to use of.....	443
original apparatus and changes thereto.....	419
reactions of.....	441
results from treatment.....	420
List of illustrations.....	vii
Little Falls, N. J., rapid sand filters at.....	46
London, first filter plant erected at.....	31
Louisville, early investigation of filtration at.....	56
rapid sand filters at.....	56
Management, factors entering into water works.....	695
undeveloped field in water works.....	694
Manila, gravity water supply at.....	338
Media, different kinds used.....	523
Members deceased.....	4, 193
Members elected.....	3, 189
Membership, statement of.....	5, 193
Metered service, information relative to.....	260, 274
Metering of fire lines, some remarks relative to.....	275
Meters, annoying noises caused by.....	657
average life of.....	676
averaging rates.....	662
best way of testing.....	657
cost of reading.....	675
effect on cost of water to consumers.....	637
experience with straight line reading.....	657
on water used for construction.....	683
possibility of over registration.....	663
repairs of.....	678
should they register cubic feet or gallon.....	667
who pays cost of.....	638
Montreal, Canada, largest slow sand filter.....	471
use of liquid chlorine.....	438
Mortality statistics at Cincinnati, Ohio.....	487
Mortality statistics at Rhode Island.....	502
New Orleans, rapid sand filters at.....	50
water and sewer connections at.....	53
New York, design of filter plant for.....	153

New York, typhoid fever in	146
New York section, constitution of	8
minutes of the meeting of	7
Niagara River, pollution of	28
Nitrite test, use in determining source of pollution of a water supply	602
NOTE ON ORTHO-TOLIDIN TEST FOR FREE CHLORINE. Paper by W. F. Montfort	734
NOTES ON THE CONTAMINATION OF A DRINKING AND RAILROAD WATER SUPPLY BY SEA WATER, AND THE REMOVAL OF THE SALT WATER FROM THE RESERVOIR. Paper by John R. Downes	709
Odors, removed by ozonization	632
Officers 1914, 1915	June II
Ortho-tolidin, action of chlorine an oxidizing agent on	734
test for free chlorine	734
Ozone, effect on algae growth	629
Ozonization for removal of odors	632
Ozonization of water abroad	632
Pavements, temporary repairs to	650
Percolating filters in sewage disposal	369
Philadelphia, before filtration installed	498
slow sand filters at	37
Pipe capacity unit, basis for fire protection for	99
Pipes, electrolytic action on	250-259
Pitot tube, theory of	81, 536
Pittsburgh, Pa., filters at	39, 467
use of chemicals with slow sand filters at	43
Pollution of boundary waters by sewage	25
Pollution by salt water	709
Pollution of Croton water	143
Pollution of water supply determined by use of nitrite test	602
Pollution, installation of filter plant does not guarantee safety	29
Pollution, legal decision in water supply case	688
Pollution of St. Clair, Detroit and Niagara Rivers	28
Poughkeepsie, N. Y., erection of first filters at	31
PRESENT DAY WATER FILTRATION PRACTICE. Paper by George A. Johnson	31
discussion by J. W. Armstrong	497
C. B. Buerger	492
C. B. Burdick	505
J. M. Caird	483
J. N. Chester	481, 506
J. A. Dallyn	504
H. F. Dunham	506
J. W. Ellms	487
G. W. Fuller	490
J. H. Gregory	466
Paul Hansen	505
W. C. Hawley	477

PRESENT DAY WATER FILTRATION PRACTICE—*Continued*

discussion by H. C. Hodgkins.....	506
G. A. Johnson (author's closure).....	509
T. A. Leisen.....	494
P. A. Maignen.....	476
R. E. Milligan.....	500
J. C. Trautwine.....	498
R. S. Weston.....	494
G. C. Whipple.....	474
Pressure recording gages, as indication of condition of pumps.....	104
benefit of.....	107
check on firemen.....	105
early recognition of value of.....	103
how installed.....	106
in the pumping station.....	103
incentive to better firing.....	104
location of.....	106
on distribution system.....	106
preservation of charts.....	108
use and benefit of.....	103
use of portable.....	107
ways useful.....	110
Pressure recording gage charts, story told by.....	109
Private fire services, charges at Freeport, Ill.....	102
control of.....	655
information relative to.....	310-319
Private service lines, information relative to.....	320-337
Proportioning concrete.....	353
Public fire service, information relative to.....	298-309
PURIFICATION OF WATER BY ULTRA VIOLET RAYS. Paper by M. von Recklinghausen.....	565
discussion by S. T. Powell.....	585
B. F. Shaw.....	586
M. von Recklinghausen.....	586
Purification of water, factor in typhoid reduction.....	733
PUSHING SERVICE PIPES UNDER PAVEMENTS. Paper by F. C. Amsbary.....	719
Queen Lane filter plant.....	431
Question box.....	637
Question 1. Do meters increase or decrease cost of water supply to	
consumers.....	637
discussion by C. F. Barrett.....	638
H. P. Bohmann.....	637
J. N. Chester.....	637
E. E. Davis.....	638
A. A. Reimer.....	637
W. J. Wills.....	638

Question Box—Continued

Question 2. How is the cost of installation and maintenance of meters borne?	638
discussion by J. D. Barnett	643
C. F. Barrett	639
H. P. Bohmann	639, 644
Oscar Bulkeley	644
J. N. Chester	639
G. F. Cooper	640
E. E. Davis	639, 647
Robert Elliott	644
C. Faller	640
Patrick Gear	643
W. C. Hawley	642
H. C. Hodgkins	639, 640
H. Hymmen	640
C. McFarland	641
J. O'Shaughnessy	645
E. E. Parker	643
G. Shoemaker	645
L. L. Tribus	645
C. W. Wiles	639, 640
W. J. Wills	639
Question 3. Experience with lead or tin lined pipe; comparative efficiency, life and cost?	648
discussion by J. M. Diven	649
P. Gear	649
C. S. Potter	650
R. J. Thomas	650
Question 4. What is the best method of making temporary repairs to pavements torn up for construction or repairs, putting in services, etc.	650
discussion by H. P. Bohmann	650
Oscar Bulkeley	651
J. M. Diven	650, 651
M. R. Sherrerd	651
Question 5. Should private fire services be shut off in case of fire sprinkler protected buildings, as soon as the fire department reaches the fire and is in action?	652
discussion by H. P. Bohmann	652
J. M. Diven	655
P. Gear	656
W. H. Randall	656
C. H. Smith	652-656
Question 6. Experience with annoying noises caused by working of water meters?	657
discussion by H. P. Bohmann	657
A. A. Reimer	657

Question Box—*Continued*

Question 7. What is the correct or best way of testing water meters?	657
Is it practical to test meters in place?	657
discussion by H. P. Bohmann	657
W. Volkhardt	657
Question 8. Experience with straight line reading meters, are they preferable to clock dial meters?	657
discussion by J. D. Barrett	658
H. P. Bohmann	658
Thomas Hodkinson	661, 662
G. Houston	659, 660
E. W. Kelly	660
C. S. Potter	662
W. H. Randall	659, 660, 662
A. A. Reimer	661, 662
W. Volkhardt	658
C. W. Wiles	659
W. J. Wills	660
W. R. Young	658
Question 9. Legal decisions concerning "average rate" when meter is out of order and not registering?	662
discussion by R. A. Jackson	663
C. S. Potter	662
Question 10. Possibility of and conditions governing over registration of meters	663
discussion by J. D. Barnett	663
H. P. Bohmann	663
A. W. Cuddeback	666
J. M. Diven	664
P. Gear	663
W. Luscombe	665
C. S. Potter	665
W. H. Randall	665
A. A. Reimer	667
W. Volkhardt	666
C. W. Wiles	664
W. J. Wills	665, 666
Question 11. Should meters register cubic feet or gallons?	667
discussion by J. M. Diven	667
A. P. Folwell	667
W. Luscombe	668
A. A. Reimer	668
C. W. Wiles	667
Question 12. How should house hot water boilers be cared for when water is shut off; what instructions should be given to occupants of houses?	668
discussion by H. P. Bohmann	668
J. E. Brooks	670

Question Box—Continued

Question 12—Continued

discussion by J. Caulfield.....	670, 671
J. M. Diven.....	668, 670
P. Gear.....	669, 670
E. W. Henry.....	670, 671
W. H. Peck.....	669
P. Walsh.....	671

Question 13. Do you use check valves on metered services, if so why
and what benefit do you derive from them?..... 671

discussion by H. P. Bohmann.....	671
J. Caulfield.....	671
A. W. Cuddeback.....	672
E. E. Davis.....	674
P. Gear.....	673
W. Luscombe.....	671
W. D. Pollard.....	674
W. H. Randall.....	673
A. A. Reimer.....	671
W. Ross.....	673
R. J. Thomas.....	671
L. L. Tribus.....	673
W. R. Young.....	672

Question 14. Has any water department or water company ascer-
tained what it costs per consumer to read, make out and collect
bills?..... 675

discussion by John Caulfield.....	675
W. S. Cramer.....	675, 676
J. M. Diven.....	676
W. Luscombe.....	675
M. R. Sherrerd.....	676

Question 15. What is the average life of a water meter, especially
the smaller size—five-eighths to one inch? Has any one any expe-
rience in regard to this?..... 676

discussion by H. P. Bohmann.....	676
P. Gear.....	677
G. Houston.....	676
W. Luscombe.....	677
A. A. Reimer.....	676

Question 16. Which is better to maintain, a meter repair department,
or send meters to the manufacturers when repairs are needed, es-
pecially in the case of small water works?..... 678

discussion by H. P. Bohmann.....	678
W. S. Cramer.....	678
G. Houston.....	679
G. A. Main.....	678
C. W. Wiles.....	678
W. J. Wills.....	678
W. R. Young.....	678

Question Box—Continued

Question 17. What is the responsibility of a water company or department for damages caused by bursting water mains?	680
discussion by H. P. Bohmann.....	680
J. M. Diven.....	680
W. H. Randall.....	680
W. R. Young.....	680
Question 18. It is a well known fact that when a thaw begins, and the frost goes out of the surface of the ground there is increased trouble from frozen underground pipe; can any one explain or give cause of this trouble?	681
discussion by P. Gear.....	681
M. R. Sherrerd.....	681
Rapid sand filters, average cost of	473
at Cincinnati.....	473
at Grand Rapids, Mich.....	472
at Toledo, Ohio.....	472
Recording gages, use and benefits of	103
Red water, study of in Croton supply.....	162
Red water question.....	66
REMARKS ON THE THEORY ON THE PITOT TUBE. Paper by N. W. Akimoff	81
discussion by J. W. Ledoux.....	536
Repairs to pavement.....	650
Reports of Committees	
Electrolysis	217
Finance.....	214
National Bureau or Department of Health	200
Permanent Headquarters	199
Publication.....	218
Standard Specifications for Cast Iron Pipe and Specials.....	220
Standard Specifications for Hydrants and Valves.....	217
Standard Specifications Wrought Iron Pipe.....	225
Tabulation of Rates and Other Information	201, 231
Water Consumption.....	215
Report of Treasurer	213
Rhode Island mortality statistics.....	502
Roxboro filter plants.....	431
Salt water, pollution of water supply by.....	709
Sand, tests for	353
used in concrete work.....	352
Sand filtration, not becoming obsolete.....	474
Sanitary survey of water shed of Great Lakes.....	24
Schedule of water rates.....	233-243
Screens, types of used in sewage disposal.....	364
Sections, minutes of New York.....	7
Service lines, private information relative to.....	320-337
Service pipes, cleaning.....	649
pushing under pavement.....	719

Sewage disposal, advancement in.....	361
Sewage disposal, at Philadelphia.....	375, 382
American conditions.....	360
contact beds.....	369
European conditions.....	360
grit chambers.....	364
lessons from study of European conditions.....	374
notable works.....	373
percolating filters.....	369
relation to water supply.....	363
river fronts.....	374
screens.....	364
tanks.....	367
SEWAGE POLLUTION OF BOUNDARY WATERS. Paper by Allan J. McLaughlin, M.D.....	24
discussion by Edward Bartow.....	529
J. M. Caird.....	532, 534
F. A. Dallyn.....	529, 530, 533
J. M. Diven.....	528
C. Faller.....	532
F. C. Kimball.....	531
F. W. Langstroth.....	531, 534
Alexander Potter.....	535
S. G. Powell.....	534
G. R. Taylor.....	532
Sewers, in ancient cities.....	359
Slow sand filters, largest at Montreal.....	471
little advancement in construction features in this country.....	483
Slow sand filtration, growth of in United States.....	32
Sludge disposal.....	371
SOME OBSERVATIONS OF THE EFFECT OF OZONE ON ALGAE GROWTHS. Paper by S. T. Powell.....	629
SOME RELATIONS BETWEEN THE WATER SUPPLY AND TYPHOID FEVER IN WASHINGTON, D. C. Paper by John Gaub.....	727
Source of water supply, etc., information relative to.....	276-297
Sprinklers, quantity of water used by.....	654
St. Clair River, not safe for water supply.....	27
St. Lawrence River, seasonal pollution of.....	28
Sterilization of water by liquid chlorine, historical sketch of in United States.....	415
Storage reservoir, catchment of.....	715
Superintendents' day made permanent feature of conventions.....	226
Table of contents.....
Tabulation of rates and other information of interest to water works.....	233
Tanks, types used in sewage disposal.....	367
Test plug for water mains.....	717
TESTING OF CHECK VALVES. Paper by J. Walter Ackerman.....	90
discussion by J. W. Ackerman.....	546, 547

TESTING OF CHECK VALVES— <i>Continued</i>	
discussion by F. A. Dallyn.....	547
E. E. Davis.....	548
George Houston.....	546
Tests for concrete work.....	346
Tests for sand.....	353
Toledo, Ohio, rapid sand filter.....	472
Torresdale filter plant at Philadelphia.....	38
analytical tests.....	406
description of bleach plant.....	405
historical sketch of.....	403
location of.....	468
Treasurer's report.....	213
Typhoid death rates before and after treatment by slow and rapid sand filtration.....	72
Typhoid fever, at Elmira, N. Y.....	485
discovery of as specific disease.....	31
in New York.....	146
prevalance of in winter and spring months.....	24
rate in American cities.....	148
relations in Washington, D. C., with water supply.....	727
statistics at Wilmington, Del.....	114
Ultra violet rays, bacterial power of.....	570
condition of water for treatment.....	582
development of apparatus.....	574
installations of apparatus.....	580
operating cost.....	584
physical characteristics.....	569
principle of.....	567
purification of water by.....	565
quantitometry of.....	572
source of.....	567
Underground sewers of ancient construction.....	359
AN UNDEVELOPED FIELD IN WATER WORKS MANAGEMENT. Paper by	
Paul Hansen.....	694
USE AND BENEFITS OF PRESSURE RECORDING GAGES. Paper by J. M.	
Diven.....	103
discussion by J. Walter Ackerman.....	550
J. M. Diven.....	549, 550
A. A. Reimer.....	549
USE OF CONCRETE IN WATER WORKS CONSTRUCTION. Paper by Edgar B.	
Kay.....	345
USE OF THE NITRITE TEST IN DETERMINING THE SOURCE OF POLLUTION OF	
A WATER SUPPLY. Paper by William Miller Booth.....	602
discussion by J. M. Caird.....	611
S. T. Powell.....	611
Value of pressure recording gages.....	103

WANDERER'S NOTES ON FOREIGN WATER SUPPLIES, A. Paper by Louis L. Tribus.....	384
Washington, D. C., efficiency of filters at.....	36
filter plant at.....	34, 484
typhoid reduction by filtration at.....	37
Water, American standard of purity low.....	135
effect on filters of acid.....	43
pollution of Croton.....	143
purification of, factor in reducing typhoid.....	733
quantity used by automatic sprinklers.....	654
question of red.....	66
reasons for coagulation of.....	58
sterilization of by liquid chlorine, historical sketch of in the United States.....	415
surface supplies not safe without treatment.....	29
Water analysis, advisability of substituting agar for gelatine.....	11
agar adopted for medium for bacterial, by Am. Pub. Health Assn....	11
Water mains, responsibility for damage by bursting.....	680
test plug for.....	717
Water purification, at Washington, D. C.....	484
balanced with sewage treatment.....	29
Water rates, effect of meters on.....	637
penalties for non-payment of.....	682
schedule of.....	233-243
Water shed protection, cost of.....	172
Water supplies, growing value of ground.....	715
laboratory control of.....	720
Water supply, source of information relative to.....	276-297
Water supply pollution, discussion.....	692
Water borne diseases, discovery of.....	31
typhoid and cholera.....	31
Water works construction, concrete in.....	345
Water works management, factors entering into.....	695
an undeveloped field in.....	694
Water works topics, general discussion of.....	682
THE WATER SUPPLY OF WILMINGTON, DEL. Paper by Edgar M. Hoopes and James M. Caird.....	111
Water-proof concrete.....	356
Wilmington, Del., bacterial results at.....	117, 125
mechanical sand washing at.....	130
new water works at.....	113
preliminary filters at.....	116
pumping station at.....	118
results of hypo and chlorine treatment.....	437
sedimentation reservoir at.....	119
slow sand filter plant at.....	121
turbidity of water at.....	118

Wilmington, Del., typhoid statistics at 114, 118
 water supply at 111
Wilmington, N. C., experience with bleach and liquid chlorine 434
 filter plant 434
 water conditions 434
Wisconsin water plant, per capita valuation 625
 physical valuation 626
 pumping capacity valuation 626
 tabulation of 617

AUTHORS' INDEX

ACKERMAN, J. WALTER, paper, LEGAL DECISIONS IN WATER SUPPLY POLLUTION CASE	688
paper, TESTING OF CHECK VALVES	90
discussion, disinfecting at Torresdale.....	450
legal decisions in pollution case.....	693
testing of check valves.....	546, 547
use of recording gage.....	550
AKIMOFF, N. W., paper, REMARKS ON THEORY OF PITOT TUBE	81
ALVORD, JOHN W., foreword.....	1
paper, EQUITABLE HYDRANT RENTALS AND BETTER METHODS FOR APPORTIONING FIRE PROTECTION COSTS	95
discussion, equitable hydrant rentals.....	699, 700, 702, 703
AMSBARY, F. C., paper, PUSHING SERVICE PIPES UNDER PAVEMENTS	719
ARMSTRONG, J. W.	
discussion, present day filtration.....	497
BACHMAN, FRANK, paper, EFFICIENCY OF HOUSEHOLD FILTERS IN CHICAGO 589	
BARNETT, J. DAVIS,	
discussion, equitable hydrant rentals.....	697
Question 2.....	643
Question 8.....	658
Question 10.....	653
BARRETT, C. F.	
discussion Question 1.....	638
Question 2.....	639
BARTOW, EDWARD, paper, LABORATORY CONTROL OF WATER SUPPLIES	720
discussion, sewage pollution of boundary waters.....	529
BATON, W. U. C., paper, INVESTIGATION INTO THE ADVISABILITY OF SUBSTITUTING AGAR FOR GELATINE AS A MEDIUM FOR THE DETERMINATION OF BACTERIAL COUNTS IN WATER ANALYSIS	11
discussion, disinfecting at Torresdale.....	523
BLANKENBURG, HON. RUDOLPH, address of welcome at Philadelphia.....	202
BLAUVELT, ALBERT	
discussion, equitable hydrant rentals.....	699, 700
charges for fire services	682
BOHMANN, H. P.	
discussion Question 1.....	637
Question 2.....	639, 644
Question 4.....	650
Question 5.....	652
Question 6.....	657
Question 7.....	657

BOHMANN, H. P.	
discussion Question 8.....	658
Question 10.....	653
Question 12.....	668
Question 13.....	671
Question 15.....	676
Question 16.....	678
Question 17.....	680
BOOTH, WILLIAM MILLER, paper, USE OF THE NITRITE TEST IN DETERMIN- ING THE SOURCE OF THE POLLUTION OF A WATER SUPPLY.....	602
discussion, use of nitrite test.....	611
BROOKS, J. E.	
discussion Question 12.....	670
BUERGER, CHARLES B.	
discussion, present day filtration.....	492
BULKELEY, OSCAR	
discussion, equitable hydrant rentals.....	697, 702
water used for construction.....	683, 684
Question 2.....	644
BURDICK, CHARLES B.	
discussion, present day filtration.....	505
CAIRD, JAMES M., paper, THE WATER SUPPLY AT WILMINGTON, DEL.....	111
discussion, Croton water supply.....	180
present day filtration.....	483
use of nitrite test.....	611
sewage pollution boundary water.....	532, 534
CAPPELEN, F. W.	
discussion, conservation of potable water.....	563
Question 12.....	670, 671
Question 13.....	671
Question 14.....	675
CHESTER, J. N.	
discussion, equitable hydrant rentals.....	545
conservation of potable waters.....	558
present day water filtration.....	481, 506
Question 1.....	637
Question 2.....	639
COOPER, G. F.	
discussion, Question 2.....	640
CRAMER, W. S.	
discussion, Question 14.....	675, 676
Question 16.....	678
CUDDEBACK, A. W.	
discussion, Question 10.....	666
Question 13.....	672
DALLYN, F. A.	
discussion, present day filtration	504
purification of water by ultra violet rays.....	585

DALLYN, F. A.
 discussion, sewage pollution of boundary waters..... 529, 530, 533
 testing of check valves..... 547

DATESMAN, GEORGE E., paper, BRIEF REVIEW OF SEWAGE DISPOSAL
 WORKS IN SOME EUROPEAN CITIES AND COMPARISON WITH THE
 PENNYPACK CREEK WORKS AT PHILADELPHIA..... 359

DAVIS, E. E.
 discussion, testing of check valves..... 548
 Question 1..... 638
 Question 2..... 639, 647
 Question 13..... 674

DIVEN, J. M., paper, USE AND BENEFIT OF PRESSURE RECORDING GAGES 103
 discussion, conservation of potable waters..... 558, 560
 Croton water supply..... 176
 efficiency of household filters..... 600
 sewage pollution of boundary waters..... 528, 529, 532
 use of recording gages..... 549, 550
 water used for construction..... 683, 684
 Question 3..... 49
 Question 4..... 650, 651
 Question 5..... 655
 Question 10..... 664
 Question 11..... 667
 Question 12..... 668, 670
 Question 13..... 676
 Question 17..... 680

DOWNES, JOHN R., paper, NOTES ON THE CONTAMINATION OF A DRINK-
 ING AND RAILROAD WATER SUPPLY BY SEA WATER AND REMOVAL OF
 THE SALT WATER FROM THE RESERVOIR..... 709

DUNHAM, H. F.
 discussion, present day filtration..... 506

ELLIOTT, ROBERT
 discussion, Question 2..... 644

ELLMS, J. W.
 discussion, present day filtration (by letter)..... 487

FALLER, C.
 discussion, sewage pollution of boundary waters..... 532
 Question 2..... 640

FOLWELL, A. PRESCOTT, paper, HOUSE TO HOUSE INSPECTION..... 635
 discussion, Question 11..... 667

FRENCH, D. W.
 discussion, Croton water supply..... 175

FULLER, GEORGE W., paper, THE CROTON WATER SUPPLY; ITS QUALITY
 AND PURIFICATION..... 135

GAUB, JOHN, paper, SOME RELATIONS BETWEEN THE WATER SUPPLY AND
 TYPHOID FEVER IN WASHINGTON, D. C..... 727

 discussion, Croton water supply..... 463
 present day filtration (by letter)..... 490

GEAR, PATRICK	
discussion, Question 2.....	643
Question 3.....	649
Question 5.....	656
Question 10.....	663
Question 13.....	673
Question 18.....	681
GREGORY, JOHN H.	
discussion, present day filtration.....	466
HALE, FRANK E.	
discussion, Croton water supply.....	179
HANSEN, PAUL, paper, AN UNDEVELOPED FIELD IN WATER WORKS MAN-	
AGEMENT.....	694
discussion, present day filtration.....	505
HASELTINE, W. E., paper, A CHEAP HOMEMADE TEST PLUG FOR WATER	
MAINS.....	717
paper, FIRE ALARM ATTACHMENT FOR RECORDING PRESSURE GAGES..	541
HAWLEY, W. C.	
discussion, equitable hydrant rentals.....	541, 700
present day water filtration.....	477
Question 2.....	642
HAZEN, ALLEN W.	
discussion, Croton water supply.....	180
HENRY, E. W.	
discussion, Question 12.....	669
HILL, NICHOLAS S., JR.	
discussion, Croton water supply.....	177
water supply pollution case.....	692
HODGKINS, H. C., paper, CONSERVATION OF POTABLE WATER AND THE	
DUAL SYSTEM OF DISTRIBUTION.....	554
discussion, conservation of potable water.....	560, 564
equitable hydrant rentals.....	698
present day filtration.....	506
Question 2.....	639, 640
HODKINSON, THOMAS	
discussion, Question 8.....	661
HOOPES, EDGAR N., paper, THE WATER SUPPLY AT WILMINGTON, DEL....	111
HOUSTON, GEORGE	
discussion, testing of check valve.....	546
Question 8.....	656, 660
Question 15.....	676
Question 16.....	679
HUY, H. F.	
discussion, disinfecting water at Torresdale.....	451
HYMMEN, H.	
discussion, Question 2.....	640
JACKSON, D. D.	
discussion, conservation of potable waters.....	561

JACKSON, R. A.	
discussion, Question 9.....	663
JENNINGS, C. A.	
discussion, disinfecting at Torresdale.....	453
JOHNSON, GEORGE A., paper, PRESENT DAY WATER FILTRATION PRAC-	
TICE.....	31
discussion, Croton water supply.....	182
disinfecting at Torresdale.....	454
present day filtration (author's closure).....	509
JOHNSON, R. F.	
discussion, collection of water rates.....	683
KAY, EDGAR B., paper, THE USE OF CONCRETE IN WATER WORKS CON-	
STRUCTION.....	345
KEELER, H. E., paper, GRAVITY WATER SUPPLY AT MANILA, P. I.....	335
KELLY, E. W.	
discussion, Question 8.....	660
KIMBALL, F. C.	
discussion, conservation of potable waters.....	562
sewage pollution of boundary waters.....	531
LANGSTROTH, F. W.	
discussion, conservation potable waters.....	561
sewage pollution of boundary waters.....	531, 534
LECONTE, L. J., paper, THE GROWING VALUE OF GROUND WATER SUP-	
PLIES.....	715
LEDOUX, J. W.	
discussion, the theory of the pitot tube.....	536
LEDERER, ARTHUR, paper, EFFICIENCY OF HOUSEHOLD FILTERS IN CHICAGO	589
LEISEN, THEODORE	
discussion, present day filtration.....	494
LUSCOMBE, WILLIAM	
discussion, Question 10.....	665
Question 13.....	671
Question 14.....	675
Question 15.....	677
MAIGNEN, P. A.	
discussion, conservation of potable waters.....	561, 564
present day filtration.....	476
MAIN, GEORGE A.	
discussion, non-payment of water bills.....	682
Question 16.....	678
MASON, DR. W. P.	
discussion, Croton water supply.....	176
McFARLAND, C.	
discussion, Question 2.....	641
MC LAUGHLIN, ALLAN J., paper, SEWAGE POLLUTION OF BOUNDARY WATERS	24
MILLER, W. E., paper, DIAGRAMMATIC METHOD OF DETERMINING COST	
PER FOOT OF CAST IRON PIPE.....	612
paper, INDIVIDUALITY OF PUBLIC UTILITIES, NOTABLY WATER WORKS	614

MILLIGAN, R. E.	
discussion, present day filtration.....	500
MONTFORT, W. F., paper, NOTE ON ORTHO-TOLIDIN TEST FOR FREE CHLORINE.....	734
discussion, efficiency of household filters.....	601
disinfecting at Torresdale.....	446
PARKER, E. E.	
discussion, Question 2.....	643
PECK, W. H.	
discussion, Question 12.....	669
POLLARD, W. D.	
discussion, Question 13.....	674
POTTER, ALEXANDER	
discussion, Croton water supply.....	456
equitable hydrant rentals (by letter).....	538
sewage pollution of boundary waters (by letter).....	535
POTTER, C. S.	
discussion, Question 3.....	650
Question 8.....	662
Question 9.....	662
Question 10.....	665
POWELL, S. T., paper, SOME OBSERVATIONS OF THE EFFECT OF OZONE ON ALGAE GROWTHS.....	629
discussion, efficiency of household filters.....	601
sewage pollution of boundary waters.....	534
purification by ultra-violet rays.....	585
use of nitrite test.....	611
RANDALL, W. H.	
discussion, sewage pollution of boundary waters.....	529, 535
Question 5.....	656
Question 8.....	659, 660, 662
Question 10.....	665
Question 13.....	673
Question 17.....	680
RECTOR, F. L.	
discussion, efficiency of household filters.....	600
REIMER, A. A.	
discussion, equitable hydrant rental.....	698
individuality of public utilities.....	696
use of recording gages.....	549
water used for construction.....	684
Question 1.....	637
Question 6.....	657
Question 8.....	661, 662
Question 10.....	667
Question 11.....	668
Question 13.....	671
Question 15.....	676

ROSS, WILLIAM	
discussion, Question 13.....	673
SHAW, B. F.	
discussion, purification by ultra-violet rays.....	586
SHERERD, MORRIS R.	
discussion, Question 4.....	651
Question 14.....	676
Question 18.....	681
SHOEMAKER, G.	
discussion, Question 2.....	645
SMITH, CHARLES H.	
discussion, shutting off sprinklers.....	652-655, 656
TAYLOR, GEORGE R.	
discussion, sewage pollution of boundary waters.....	532
THOMAS, ROBERT J., address 1914 convention.....	205
discussion, charges for fire services.....	682
testing of check valves.....	548
Question 3.....	650
Question 13.....	671
TRAUTWINE, J. C.	
discussion, present day filtration.....	498
TRIBUS, LOUIS L., paper, A WANDERER'S NOTES ON FOREIGN WATER SUP- PLIES.....	381
discussion, collection of water rates.....	683
Question 2.....	645
Question 13.....	673
VAN GILDER, L., paper, FORTY-EIGHT INCH CAST IRON FORCE MAIN FOR ATLANTIC CITY, N. J.....	704
VOLKHARDT, WILLIAM	
discussion, Question 7.....	657
Question 8.....	658
Question 10.....	666
VON RECKLINGHAUSEN, M., paper, PURIFICATION OF WATER BY ULTRA- VIOLET RAYS.....	565
discussion, purification of water.....	586
WALSH, P.	
discussion, Question 12.....	671
WEST, FRANCIS D., paper, DISINFECTION 200,000,000 GALLONS OF WATER A DAY; EXPERIENCE WITH CHLORIDE OF LIME AND LIQUID CHLORINE AT TORRESDALE FILTRATION PLANT.....	403
discussion, substituting agar for gelatine.....	523
WESTON, ROBERT SPURR	
discussion, present day filtration.....	494
disinfecting at Torresdale.....	448
WHIPPLE, GEORGE C.	
discussion, present day water filtration.....	474
disinfecting at Torresdale.....	455

WILES, C. W.	
discussion, Question 2.....	639, 640
Question 8.....	650
Question 10.....	664
Question 11.....	667
Question 16.....	678
WILLS, WIRT J.	
discussion, Question 1.....	638
Question 2.....	639
Question 8.....	660
Question 10.....	665, 666
Question 16.....	678
YOUNG, WILLIAM R.	
discussion, Question 8.....	658
Question 13.....	672
Question 16.....	678
Question 17.....	680

